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CONTROL OF FUSIFORM RUST IN A SLASH PINE OUTPLANTING WITH A SYSTEMIC FUNGICIDE

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by

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ABSTRACT

One or two foliar and soil applications of the systemic fungicide benodanil during April and May successfully controlled fusiform rust in a 1-year-old slash pine plantation. Approximately one-half as many branch galls and one-quarter as many stem galls appeared on treated trees as those left untreated.

INTRODUCTION

The systemic fungicide benodanil (2-iodobenzanilide), manufactured by BASF Wyandotte, has shown effect against rusts, smuts, and Rhizoctonia sp. Among the important rusts controlled are coffee rust, bean rust, and flax rust (Khatua, et al., 1977).

Benodanil was first tested for fusiform rust control in a greenhouse at the Southern Forest Experiment Station in Gulfport, Mississippi (Hare and Snow, 1976). Inoculated, treated seedlings showed no rust whatever. In tests in 1976 and 1977, this material proved more effective in reducing infection as opposed to nontreated seedlings in four State and industrial nurseries in South Carolina, Georgia, and Alabama (Snow and Rowan, personal communication). These studies also indicated it was as effective as Ferbam. Since Ferbam is normally applied 15 to 20 times during the growing season, benodanil applied only four times would still be a suitable alternative.

Control of fusiform rust in an outplanting during the second and third growing seasons would greatly reduce incidence since most stem infections occur prior to age 5. During the first year of outplanting, poor growth following transplanting shock reduces infection to a minimum.

As part of a Forest Service Research-State and Private Team, this evaluation was conducted while other nursery studies with benodanil were implemented by Dr. Snow of the Gulfport Station (Southern Forest Experiment Station) and research associates from the Athens Station (Southeastern Forest Experiment Station) and Auburn University.

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MATERIALS AND METHODS

A 1-year-old slash pine plantation in Allen Parish, Louisiana, was selected for the evaluation. Seedlings here were making good growth and were located within one-half mile of a 5-year-old slash pine plantation with 44 percent fusiform rust stem-cankering. The 1-year-old plantation itself had 4 percent stem-cankering. Thus, the evaluation was in a favorable area for rust infection.

Four rows were selected with 100 living seedlings per row. Each row contained three treatments listed below and a nontreated control established randomly. Thus, the experiment provided four comparisons replicated four times with 25 seedlings per treatment per replicate.

The formulation BAS-317-10F (EC) of benodanil was used as a foliar and soil treatment at a rate of 660 ppm or 15.14 ml/gal. The foliar spray was applied to the point of runoff. The soil around the drip line only was drenched. This material has shown systemic qualities and is soil active. Three treatments in the spring of 1977 were applied as follows:

(1) One spray at the time of telial formation of the rust on oaks.

(2) Two sprays 1 year apart at the time of telial formation. At this communication this treatment is identical to treatment 1.

(3) Two sprays -- one at the time of telial formation and the second one month later.

Observations of seedlings were made the following April to determine the total number of branch and stem galls present in the now 2-year-old plantation.

RESULTS AND DISCUSSION

A highly significant difference at the 1 percent level in gall development was found between the nontreated (treatment 4) and treated (treatments 1 to 3, inclusive) seedlings (table 1). Branch and stem-cankering were consistently higher in treatment 4 than treatments 1 to 3 for all replicates except the branch cankering in replicate 2 of treatment 2.

There were little or no differences between sprayed treatments. Inconsistencies occurred within the same replicate for these treatments. At this writing, treatments 1 and 2 are the same. Treatment 2 received another application in the spring of 1978, but an evaluation of its effects cannot be made until January of 1979.

Control of fusiform rust in the outplanting with one or two systemic sprays would reduce rust significantly in the critical second and third years of growth when infection results in the greatest damage to pine trees. Ferbam, though effective in the nursery, could not be considered in an outplanting where a large number of applications would be too costly. Registration of benodanil, however, is in doubt because of its cost of production and possible adverse effect on mycorrhizae (Kelley and Snow, 1977). This effect, expressed in the form of reduced growth or yellowing, was not observed in this experiment.

Table 1. Total branch (B) and stem (S) cankers resulting from second year infection present on 25 seedlings in each of four replicates in three treatments (1, 2, 3) of benodanil and a nontreated control (4) in a 2-year-old slash pine plantation in Allen Parish, Louisiana

	Treatments[a]							
	1		2		3		4	
Replicates	B	S	B	S	B	S	B	S
1	6	2	11	2	9	3	31	5
2	8	1	16	3	4	1	13	6
3	5	1	1	0	30	2	37	8
4	11	1	11	3	4	2	24	12
Totals	30	5	39	8	47	8	105	31

1) One spray at the time of telial formation of the rust on oaks.

2) Two sprays one year apart at the time of telial formation.

3) Two sprays - one at the time of telial formation and the second one month later.

4) A nontreated control.

LITERATURE CITED

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